**DENALI NATIONAL PARK AND PRESERVE**

**CENTRAL ALASKA NETWORK**

**Vegetation Monitoring Program**

# Summary Trip Report: Double Mountain Mini-grid

**29 June –5 July, 2009**

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**PURPOSE:**

The purpose of this trip was to establish 25 permanent vegetation monitoring plots in the Double Mountain mini-grid according to the Central Alaska Network (CAKN) vegetation monitoring protocols (see Roland *et al*. 2005). We successfully visited 16 points; the remaining nine were inaccessible due to steep, dangerous terrain.

**PERSONNEL:**

Carl Roland – crew leader, navigation, plot photos, vascular plant composition/collection
Peter Nelson – navigation, non-vascular plant composition/collection, soils
Jamie Martin – plot/quadrat variable estimates, transect data

**ACCESS TO MINI-GRID AND CAMPING POSSIBILITIES:**

The Double Mountain mini-grid is located east of the Igloo Creek Campground on the Park Road, between the Sanctuary River and the upper reaches of the Teklanika River. To get there, it is necessary to fly by helicopter from the airstrip near headquarters. This trip takes just 15 to 20 minutes one way.

Photo 1. Camp location in the Double Mountain mini-grid. Photo by Carl Roland.

We camped near the middle of the mini-grid, near the convergence of two small melt water streams. This was a sensible option: easily accessible by helicopter, central location, abundant freshwater. Although we carried water in with us, we could have filtered the stream water for drinking. We did use the stream water for cooking and cleaning.

**HIKING:**

The Double Mountain mini-grid is a very steep place. Elevations range from 3500 feet to 5970 feet abruptly with many sharp ups and downs in between. The hiking was slow at times, especially because the quickest way to travel between points in this mini-grid is almost never a direct way. For example, following a contour across a slope inevitably resulted in meeting a deep gulley or cliff which must be circumnavigated. Much of the hiking is on loose scree slopes with uncertain footing. The tradeoff of course, comes in the nice views from the top.

**WEATHER AND ENVIRONMENTAL CONDITIONS:**

Weather during our trip to the Double Mountain mini-grid was mostly pleasant. We had a few episodes of rain, but nothing that lasted more than a day. Afternoon showers usually ended in sun and rainbows before evening. The evening of July 2 there was a thunder and lightning storm, but it too, did not last long. Generally it was warm and breezy, and cool at night. During the last days of our visit, smoke from wildfires filled the air, reducing visibility and at times blocking out the sun.

**SAFETY CONSIDERATIONS:**

Perhaps the greatest concern for safety in the Double Mountain mini-grid is the steep terrain and loose footing. Caution and common sense apply here. We saw evidence of grizzly bear digging around some ground squirrel burrows, and some Dall sheep on the steep mountainsides, but had no wildlife encounters to speak of. We experienced one thunder and lightning storm. In high, treeless terrain, vulnerability to lightning strikes should be considered. Southeast of camp is an area with a very large, very fresh landslide. The crew heard a nearly steady sound of small landslides and rocks falling when working in this area. Future crews sampling this mini-grid should realize that things are still very unstable in this area, and use due caution.

**PHENOLOGY OBSERVATIONS:**

| **Examples of species observed in fruit** | **Examples of species observed in flower** |
|---|---|
| *Dryas octopetala* | *Carex scirpoidea, C. microchaeta, Dryas alaskansis* |
| *Cardamine purpurea* | *Oxytropis nigrescens, O. maydelliana, Astragalus polaris* |
| | *Pedicularis capitata, Stellaria longipes, Parnassia kotzebuei* |
| | *Taraxacum carneocoloratum, Silene acaulis, Saxifraga cernua* |

**GENERAL NOTES ON PLOT-WORK AND PLOT OBSERVATIONS:**

Due to the steep terrain and strenuous hiking, the crew decided partway through the grid to leave the heavy Tablet PC behind and work off of paper datasheets. This may be a consideration to future crews working in the mini-grid. Also, there were no trees present in the grid (other then a few tiny seedlings) so some of this equipment could be left behind to save weight on the helicopter.

At the time we were dropped off, Shane, the helicopter pilot, offered to fly the crew up to one of the surrounding ridges and drop us off, to save us the hiking time and effort to get there so we could get more work done our first day. This was an excellent suggestion, but unfortunately it was not in our flight plan. Future crews should consider incorporating a "boost uphill" into their flight plans for the first day. With an early start, plots 4, 5, and 10 could all be done in one day (two are barren scree slopes) with only a downhill walk on the way back. Then the crew would start the mini-grid with the two westernmost rows done (including the inaccessible plots), and the steepest climbing unnecessary.

Our crew took six days to sample the Double Mountain mini-grid and came out of the field on day seven. Future crews should plan on finishing this grid early. Although we had good weather on our side, we spent a good deal of time trying to get to some of the plots later declared inaccessible. In the future, much of this extra hiking around would be unnecessary, and the sampling could be finished even sooner, especially if the above-mentioned helicopter strategy were employed.

Species diversity was high in plots containing vegetation. The average vascular plant species was 47 per plot, with the highest having 70 species.

Although we probably selected the ideal campsite, much of the area is inhabited by ground squirrels. They were very bold and aggressive, and took a particular liking to the soil samples, which were stored in the creek to keep cool. In spite of Peter's best efforts to defend his samples, squirrels destroyed one whole sample by chewing into a bag and emptying its contents. Future soil technicians should come prepared with a strategy for defending their samples.

**Table 1. Collection series for the Double Mountain mini-grid.**

| Collector | Identifier | Series |
|---|---|---|
| Roland | Vascular plants | CR-09-007 to CR-09-073 |
| Nelson | Nonvascular plants | PRN-09-052 to PRN-09-166 |
| Roland | Photos | 100-0230 to 100-0453 |
| Nelson | Soils | 13 samples |

**ACTIVITES:**

| Date | Activity | Comments |
|---|---|---|
| June 29 | Travel, set up camp | |
| | Plot 4 | Talus slope on ridge top, trace vegetation |
| | Plot 3 | Crew got as close as possible to this plot before declaring it inaccessible. |
| June 30 | Plot 5 | Dryas lichen tundra, beautiful views! |
| | Plot 10 | Steep talus slope, soil depths and some measurements not taken. |
| | Plot 9 | Plot inaccessible, point landed in snow and ice above a flowing stream of meltwater. |
| July 1 | Plot 16 | Hillside above flowing stream, part willow scrub and part ericaceous tundra |
| | Plot 22 | Dryas tundra on slope |
| | Plot 21 | Larger jumbled rocks with diverse lichen community, mixed with small patches of vegetation |
| July 2 | Plot 18 | Point inaccessible, made some estimates from a distance. |
| | Plot 23 | Dwarf scrub scrub on loose rocky hillside |
| | Plot 17 | Scree slope above creek |
| July 3 | Plot 7 | Dryas tundra mixed with rock. Plot situated on a ridgeline with cliffs dropping off to the E of the plot on the 13 m mark. |
| | Plot 8 | Plot monument is offset because of bedrock. From monument to plot center: az 232 dist 5.1 m. Mix of barren and Dryas tundra. |
| | Plot 13 | Barren scree slope in a narrow gully with flowing stream, water in quads C and B. Water also seeping out of ground and flowing through plot. |
| July 4 | Plot 12 | Lots of smoke in air from wildfires. Slope with long grooved depressions from snow melt water positioned above a flowing stream. Cassiope tundra. Found first tree in minigrid 2 cm *Picea glauca*. |
| | Plot 11 | Cassiope tundra, hill above landslide-filled valley. |

Photo 2. Plot 10, located on a steep scree slope. Soil samples and some other measurements were not made at this location. Photo by Peter Nelson.

Photo 3. Plot 21 had a diverse lichen community. Photo by Carl Roland.

Photo 4. Plot 9 was located on snow, ice and frozen talus above a flowing melt water stream. Note the yellow Trimble and soil probe in the bottom center of the image. This point was declared inaccessible. Photo by Carl Roland.

Photo 5. Plot 7 was located in the center of a very narrow ridge (less than the 16 meters of the transect tape), with cliffs dropping off on each side. Photo by Carl Roland.

**LANDSLIDE**

At some point between 2006 when our IKONOS imagery was taken and our visit, a massive landslide occurred within the Double Mountain mini-grid. This landslide originated near Plot 2 and filled in the valley beneath it, flowing in a northerly direction a total of 1.5 km and terminating into the same stream that flows past our camping area. When the crew was working in the vicinity of the landslide, they could hear tiny slides and loose rocks falling every few minutes. From a greater distance, such as camp, we would hear a few larger slides every evening. The team hiked across the slide zone between plots 11 and 12 (Photo 7). In addition to mineral soil and boulders, there were whole intact chunks of earth with plant communities still on top, completely undamaged from the fall. Some of these communities were Dryas tundra in full bloom. Carl and Peter took several large panoramic shots of the landslide .


Image 1. IKONOS image of the Double Mountain mini-grid with the path of the landslide outlined in black.

Photo 6. Looking south at landslide from auxiliary photo point 26A, uphill and a little northwest of Point 16. Photo by Carl Roland.

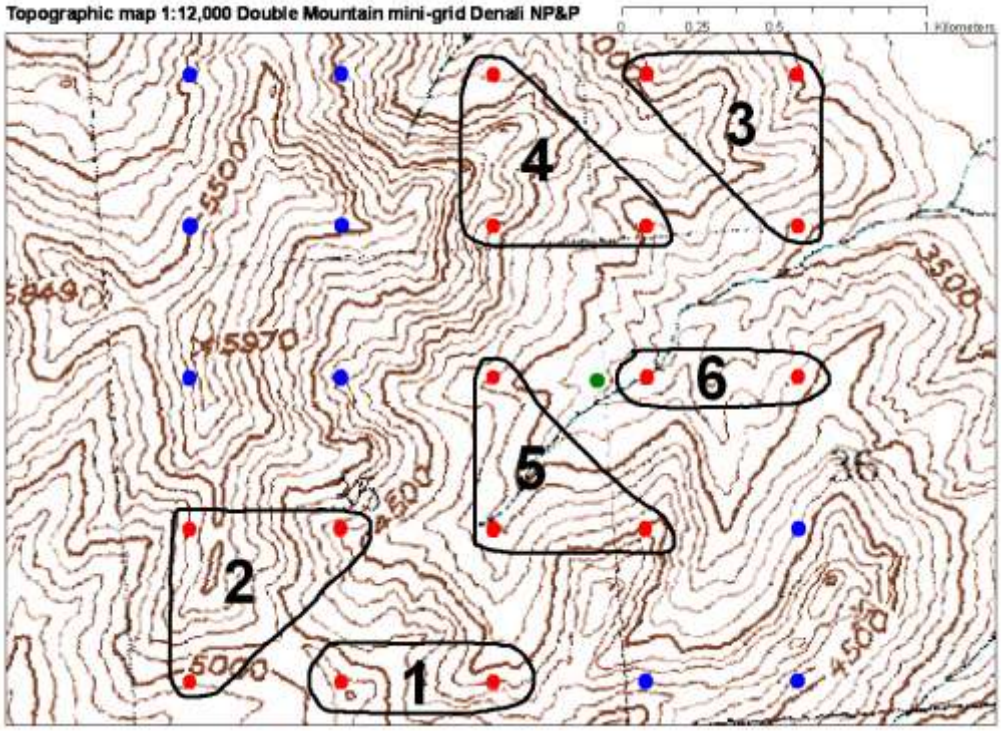
Photo 7. Photo taken when crossing landslide between points 11 and 12. Note chunks of intact vegetation surviving the slide. Photo by Carl Roland.

## CONCLUSION AND FUTURE CONSIDERATIONS

The Double Mountain mini-grid offers the chance to hike in a spectacular landscape and observe plant communities living at the uppermost range of tolerance. Great diversity can be found where the substrate allows.

Take home messages for future sampling of the Double Mountain mini-grid:

- Come prepared to hike—this grid is physically demanding
- Save weight in the helicopter by leaving tree sampling equipment at home
- When writing the flight plan, consider using the helicopter for a quick lift from camp to the SW corner of the grid, as described previously
- Soil technicians should be vigilant to protect samples from ground squirrels
- Plan for possibility of departing the Double Mountain mini-grid earlier than 10 days




Map 1. Annotated topographic map of the Double Mountain mini-grid. Red points were visited, blue points were inaccessible, green point is camp location. Numbers indicate day plot cluster was sampled.

## REFERENCES CITED

Roland, C.A., Oakley, K., Debevec, E. & Loomis, P. (2005) Monitoring vegetation structure and composition at multiple spatial scales in the Central Alaska Network. National Park Service, Central Alaska Network, Final Monitoring Protocol.